

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 10/696,152

Examiner: Erica E. Cadugan

Filing Date: 10/29/2003

Group Art Unit: 3722

Inventor: Broghammer et al.

For: Adjustment Device for a Fine Machining Tool

Attorney Docket No. 696.022

Reply

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated March 16, 2006, please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper

Amendments to the claims begin on page 3 of this paper.

Remarks begin on page 6 of this paper.

In the Specification:

On page 10, line 20, please add the following paragraph,

--Fig. 7a is a lateral view of a centrally restrained reamer according to the invention;--

Amendments to the Claims:

The following listing of claims will replace all prior versions and listing of claims in the application.

1. (Currently Amended) An adjustment device for adjusting the position of at least one cutter of a fine machining tool with respect to a cutter support, the cutter support having a longitudinal axis, the adjustment device comprising:

the cutter support [**being substantially unitary and**] bordering at least one **enclosed** pressure chamber which is arranged in an [**the**] adjustment direction of the at least one cutter with a displacement with respect to the at least one cutter and which is filled with a pressure transfer means which can be placed under pressure with a pressure generation device, wherein between the at least one cutter and the at least one pressure chamber a cutter support wall remains which is elastically deformable upon application of pressure by the pressure transfer means to adjust the [**at least one cutter**] position.

2. (Currently Amended) The adjustment device according to claim 1, wherein the at least one cutter and the **at least one** pressure chamber are arranged in alignment in the adjustment direction.

3. (Currently Amended) The adjustment device according to claim 1, wherein the length (LD) of the at least one pressure chamber in the orthogonal direction to the adjustment direction corresponds essentially to the length (LS) of the **at least one** cutter.

4. (Currently Amended) The adjustment device according to claim 1, wherein the length of the pressure chamber in the orthogonal direction to the adjustment direction is limited to the region of a tool corner corresponding to the at least one cutter.

5. (Previously Presented) The adjustment device according to claim 1, wherein the elastic deformation between the at least one pressure chamber and the at least one cutter lies in the size range of the cutter adjustment.

6. (Previously Presented) The adjustment device according to claim 1, wherein the pressure transfer means is an at least approximately incompressible fluid.

7. (cancelled)

8. (Previously Presented) The adjustment device according to claim 1, wherein the pressure generation device includes a screw which can be screwed into a blind threaded hole.

9. (Previously Presented) The adjustment device according to claim 8, wherein the blind threaded hole is separated by an axial distance from the at least one pressure chamber and is connected to the at least one pressure chamber via connecting channels.

10. (Previously Presented) The adjustment device according to claim 8, wherein there is a predetermined relationship between an input quantity of the pressure generation device and the resulting positional adjustment of the at least one cutter.

11. (Previously Presented) The adjustment device according to claim 1, wherein the position of the at least one cutter is adjustable in the radial direction.

12. (Previously Presented) The adjustment device according to claim 1, wherein the at least one pressure chamber is formed with a ring shape.

13. (cancelled)

14. (Currently Amended) The adjustment device according to [one of the claims] claim 1, wherein the cutter support is a tool mounting basic element.

15-18. (cancelled)

19. (Currently Amended) An adjustment device according to claim 14, wherein the tool mounting basic element includes **[the] a** central tool holder with **an** assigned expansion chuck.

20. (cancelled)

21. (Previously Presented) The adjustment device according to claim 19, wherein the adjustment device and the expansion chuck have separate pressure chambers which have a pressure coupling.

22. (cancelled)

23. (Previously Presented) A fine machining tool comprising an adjustment device according to claim 1.

REMARKS

Though this Reply is being filed in response to a Final rejection, no new matter has been included, and the amendments create no new issues requiring further search, and thus entry of the above amendments is respectfully requested. Claims 1-4, 14 and 19 have been amended. Claims 1-6, 8-12, 14, 19, 21 and 23 are pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the foregoing amendments and the remarks that follow.

Initially, Applicant acknowledges with appreciation the indication of allowable subject matter in claims 8-10. However, in view of the present amendments and the below arguments, Applicant has chosen not to re-write these claims at this time.

Next, Applicant acknowledges the §112 issues with claims 2, 3 and 19 and has amended these claims, as well as claims 4 and 14, to appropriately overcome the antecedent basis problems. Also, Applicant believes claim 21 is in compliance with §112. No new matter has been added, these amendments being made for clarification purposes only. An indication to this effect is respectfully requested.

The preferred embodiments are directed to an adjustment device for a fine machining tool which is used to position one or more cutters of the tool which are mounted on a cutter support. An offset or adjustment of the cutter(s) is achieved using an appropriately located pressure chamber, an enclosed space by definition, disposed adjacent to a cutter support wall and positioned in an adjustment direction. Generally, application of pressure by a pressure transfer means in the pressure chamber directly causes the cutter support wall, which is elastically deformable, to flex and thus cause a positional displacement of the cutter adjacent thereto in the

adjustment direction at the location of the pressure chamber/cutter support wall. Control of the displacement of the cutter is precise, with movement being provided substantially only by the cutter support wall while the remainder of the cutter support is stationary. Through appropriate manipulation of the pressure generation device and the position of the pressure chamber/elastically deformable cutter support wall, the position of the cutter can be adjusted in the desired manner.

In contrast, U.S. Pat. No. 6,270,295 to *Hyatt et al.*, which corresponds to WO 02/060624 A2 (co-pending European patent application), discloses a tool that does not include a pressure chamber. *Hyatt et al.* discloses a tool having an open, axial slot 338 through which fluid flows, and a structure for supporting the cutter that includes weakened portions that allow the two halves of the structure supporting the cutter, not just a wall, to be spread apart by the fluid pressure generated by flowing fluid through the slot 338. (See, e.g., Figure 5, two-part construction 334, 336). Notably, due to the two-part separation of the tool end, pressure fluid tends to leak from the tool ends so that as the two halves are spread apart the amount of pressure that can be generated is limited. This is in direct contrast to the present invention as defined in claim 1 which defines a pressure chamber, i.e., an enclosed space to accommodate the fluid under pressure.

Moreover, given the two-part separation of the tool end of the *Hyatt et al.* device, the tool is limited to radial displacement of cutting edges which lie diametrically opposed to one another. As a result, there is no way to independently adjust cutting edges of a boring tool that has multiple circumferentially distributed cutting edges. A still further effect of the two-part separation of the tool end is that it is only possible to adjust both the cutting edges either

simultaneously, or when the slot (e.g., 338 in Figure 5 or 938 in Figure 20) lies outside the center, in a pre-determined proportion to the adjustment means. In other words, the cutting edges cannot be controlled individually and independently of one another, which is in direct contrast to the present invention as defined in Claim 1 which defines pressure chambers that are appropriately positioned together with deformable cutter support walls to provide fine adjustability of cutter positions in selected directions. The cutting edges can be adjusted axially or at an angle by appropriately placing one or more “pressure chambers” and associated deformable “cutter support walls” (as defined in the claims) at selected positions. The elastically deformable walls move the cutter in response to fluid pressure in the enclosed pressure chamber while the body of the cutter support does not move, thus allowing specific placement of cutters and the corresponding ability to control their position using appropriately disposed pressure chambers.

In this regard, to clarify the “at least one pressure chamber” of the claims Applicant has added the term “enclosed” to claim 1. Notably, because the term “chamber” is well understood to mean “enclosed” Applicant steadfastly contends that this is merely a clarifying amendment, and does not create any issues requiring further search and thus should be entered. See, for example, Merriam-Webster Online, www.m-w.com (June 16, 2006), chamber (2): a natural or artificial *enclosed* space or cavity (emphasis added). With respect to the rejection, *Hyatt et al.* (338, 342, 344) clearly do not disclose an enclosed pressure chamber as elements 338, 342, 344 are not enclosed, e.g., fluid freely flows out the front end of slot 338. As a result, *Hyatt et al.* cannot anticipate independent claim 1.

Also, as a result, because *Hyatt et al.* does not disclose a “pressure chamber” as defined in claim 1, Applicant believes that the finality of this Action should be withdrawn. An indication to this effect is respectfully requested.

Regarding the Examiner’s Response to Arguments, Applicant understands that some of the benefits noted in its last Reply are not included in the claims. This discussion was presented merely to help the Examiner understand the effects of the limitations not disclosed by *Hyatt et al.*, including, for example, the “at least one pressure chamber.”

In view of the present amendments and the above arguments, claim 1 is not anticipated by the *Hyatt et al.* patent. Similarly, claims 2-6, 8-12, 14, 19, 21 and 23 dependent on allowable claim 1, are likewise allowable. An indication to this effect is respectfully requested.

CONCLUSION

In view of the present amendments and the above arguments, it is submitted that claims 1-6, 8-12, 14, 19, 21 and 23 are in compliance with 35 U.S.C. Sections 102, 103 and 112 and as such each define patentable subject matter. A Notice of Allowability is therefore respectfully requested. The Examiner is invited to contact the undersigned by telephone if it would help expedite the prosecution and allowance of this application.

No fees are believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

Respectfully submitted,

Jay G. Durst, Reg. No. 41,723

Dated: **June 16, 2006**
BOYLE, FREDRICKSON, NEWHOLM,
STEIN & GRATZ S.C.
250 Plaza, Suite 1030
250 East Wisconsin Avenue
Milwaukee, WI 53202
Telephone: (414) 225-9755
Facsimile: (414) 225-9753